

WHAT IS CLAIMED IS:

1. A method for identifying a component substances in a sample using a luminescent biological agent comprising:
  - 5 preparing a luminescent biological agent;
  - 10 obtaining a sufficient volume of the sample to comprise a test sample;
  - 15 separating the component substances of the test sample by applying the test sample to a separation phase matrix to provide isolated component substances of the test sample; and
  - 20 exposing the isolated component substances to the luminescent biological agent to identify the isolated component substances of the sample.
2. The method of claim 1 wherein the luminescent biological agent is a luminescent bacteria, a luminescent fungi, a luminescent fish extract, a luminescent dinoflagellate a luminescent firefly extract, a luminescent anthrozoan, a luminescent earthworm extract, a luminescent collenterate extract, a luminescent crustacean.
3. The method of claim 1 wherein the luminescent biological agent is a luminescent bacteria.
4. The method of claim 3 where the luminescent bacteria comprises *Photobacterium leiognathi*, *Photobacterium phosphoreum*, *Vibrio fischeri* (ATCC Acc. 7744) or *Vibrio harveyi* (ATCC Acc. No. 33843).
5. The method of claim 1 wherein the luminescent biological agent is *Vibrio fischeri*, (ATCC Acc. No. 7744) or *Vibrio harveyi* (ATCC Acc. No. 33843)
6. The method of claim 1 wherein the luminescent biological agent is *Vibrio fischeri* (ATCC Acc. No. 7744).
7. The method of claim 1 wherein the test sample is a liquid sample, a solid sample or a gaseous sample.
8. The method of claim 7 wherein the separation phase matrix is chromatography paper and the test sample is a liquid sample.

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9. The method of claim 8 wherein the isolated [component] substances of the test sample are exposed to a luminescent biological agent comprising a luminescent bacterium in a suspension suitable for spraying onto a chromatography paper.

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10. The method of claim 9 wherein the isolated [component] substances of the test sample are identified by a zone of bacterial luminescent inhibition on the exposed chromatography paper.

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11. The method of claim 1 wherein the test sample comprises components of garlic, DIAZANON®, LINDANE®, SEVINE®, ROUNDUP, mercury, lead, or cadmium.

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12. The method of claim 9 wherein the volume of the luminescent biological agent comprises a suspension of  $10^8\text{--}10^9$  bacterial cells/ml.

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13. A method for identifying a toxicant in a sample using a luminescent biological agent comprising:  
preparing a luminescent biological agent which is inhibited by a substance which is toxic to an organism;

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obtaining a sufficient volume of the sample suspected to contain a substance which is toxic to an organism to provide a test sample;

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separating the component substances in the test sample to provide isolated component substances; and  
exposing the isolated component substances to a toxicant-indicating concentration of the luminescent biological agent to form zones of luminescent inhibition;  
identifying a toxicant harmful to an organism as the component substances of the sample at the zones of luminescent inhibition.

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14. A method for chemically identifying a toxicant in a sample harmful to an organism using a luminescent biological agent comprising:  
preparing a luminescent biological agent which is inhibited by a substance which is toxic to an organism;

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obtaining a sufficient volume of the sample suspected to contain a substance which is toxic to an animal to provide a test sample;

separating the [component] substances of the test sample through a separation phase matrix to provide a first group of isolated [component] substances;

5 exposing the first group of isolated [component] substances to a toxicant-indicating concentration of the luminescent biological agent to form zones of luminescent inhibition; identifying a toxicant harmful to an organism as the [component] substances of the sample at the zones of luminescent inhibition;

10 obtaining a second volume of the sample to form a second test sample;

15 separating the [component] substances of the second test sample through a separation phase matrix to provide a second group isolated [component] substances of the sample;

20 determining the chemical identity of the isolated [component] substances by analyzing the second group of isolated [component] substances which correspond to the zones of luminescent inhibition from the first group of isolated [component] substances to chemically identify the toxicant harmful to an organism in the sample.

25 15. The method of claim 13 wherein the toxicant is harmful to a virus.

30 16. The method of claim 14 wherein the organism is a plant, an animal or a microorganism.

17. The method of claim 14 wherein the animal is a human.

35 18. The method of claim 13 or 14 wherein the toxicant is selected from the group consisting of:

40 pesticides;  
herbicides;  
heavy metals; and  
plant extracts.

45 19. The method of claim 13 or 14 wherein the toxicant is a pesticide DIAZANON®, LINDANE®, or SEVIN®.

50 20. The method of claim 13 or 14 wherein the toxicant is a herbicide ROUNDUP® or WEED-B-GONE®.

21. The method of claim 13 or 14 wherein the toxicant is a heavy metal mercury, lead or cadmium, or salt thereof.

22. The method of claim 13 or 14 wherein the luminescent biological agent is a luminescent bacteria.

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23. The method of claim 13 or 14 wherein the luminescent biological agent is *Photobacterium phosphoreum*, *Vibrio fischeri*, (ATCC Acc. No. 7744) *Vibrio harveyi* (ATCC Acc. No. 33843) or *Photobacterium leiognathi*.

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24. The method of claim 13 or 14 wherein the luminescent biological agent is *Vibrio fischeri* (ATCC Acc. No. 7744) or *Vibrio harveyi* (ATCC Acc. No. 33843).

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25. The method of claim 13 or 14 wherein the luminescent biological agent is a luminescent bacteria and the toxicant detecting concentration of the bacteria is a suspension of about  $10^8$ - $10^9$  bacteria cells/ml.

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26. The method of claim 13 wherein the chemical identity of the isolated [component] substances of the test sample is achieved by analyzing the isolated component substances of the sample by HPLC, nuclear mass spectrometry, infrared spectroscopy, mass spectroscopy or electron capture detection.

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30. 27. The method of claim 13 or 14 wherein the test sample is separated into isolated [component] substances with a thin layer chromatography plate and wherein the isolated [component] substances are exposed to a suspension of the luminescent biological agent, and wherein the luminescent biological agent is a suspension of luminescent bacteria.

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30. 28. The method of claim 27 wherein the luminescent bacteria is sprayed onto the thin layer chromatography plate to provide zones of inhibition to identify the toxicant in the test sample.

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30. 29. The method of claim 27 wherein the luminescence of the bacterial agent is not inhibited by Volck oil spray or calcium ion.

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30. 30. The method of claim 27 wherein the inhibition of luminescence of the bacterial agent is greater for a toxicant DIAZANON® than for a toxicant LINDANE®.

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31. The method of claim 27 wherein the inhibition of luminescence of the bacterial agent is greater for a toxicant DIAZANON® than for a toxicant LINDANE®.

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32. The method of claim 27 wherein a solvent is used to separate [component] substances of the sample, and the solvent comprises ETOH, Hexane/THF or acetonitrile/water/aqueous ammonia.

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33. A kit for the identification of a toxicant in a sample using a luminescent biological agent, said kit comprising:

a carrier means adapted to receive at least two container means and at least one separation phase matrix in close confinement therewith;

at least one separation phase matrix;

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a first container means comprising a luminescent biological agent; and

a second container means comprising a diluent for the luminescent biological agent.

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34. The kit of claim 33 wherein the separation phase matrix is Whatman chromatography paper or a thin layer chromatography plate.

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35. The kit of claim 33 wherein the separation phase matrix is a thin layer chromatography plate.

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36. The kit of claim 33 wherein the luminescent biological agent is a luminescent bacteria, *Photobacterium phosphoreum*, *Vibrio fischeri* (ATCC Acc. No. 7744), *Vibrio harveyi* (ATCC No. 33843) or *Photobacterium leiognathi*.

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37. The kit of claim 33 wherein the luminescent biological agent is a luminescent bacteria, *Vibrio fischeri* (ATCC No. 7744) or *Vibrio harveyi* (ATCC 33843).

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38. The kit of claim 33 wherein the luminescent biological agent is a luminescent bacteria, *Vibrio fischeri* (ATCC Acc. No. 7744).

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39. The kit of claim 33 wherein the luminescent biological agent is a bacterial agent in a lyophilized form.

5 40. The kit of claim 33 wherein the diluent is a saline solution comprising between 1%-3% NaCl wt/vol.

10 41. The kit of claim 33 wherein the diluent is an about 0.5 M NaCl saline solution.